REMARKS

The present invention relates to a coating for water blocking agents comprising a water-absorbing resin (a), a hydrophilic binder resin (b), and a solvent (c) as essential components, wherein the hydrophilic binder resin (b) has an acid value of 40 mg KOH/g to 500 mg KOH/g, and to a water blocking construction method which utilizes such coating for water blocking agents.

In the Office Action, the Examiner (1) objected to the title as being too long, (2) rejected claims 1-5 under 35 U.S.C. § 112, second paragraph regarding the definiteness of "water blocking agent(s)" and "water blocking construction method", requesting clarification of the claims, and (3) rejected claims 1-5 under 35 U.S.C. § 103(a) based on U.S. Patent 4,042,012 (Perry et al) in view of an alleged admission by Applicants at page 1, lines 33+ of the specification.

In response to the Office Action, and to improve the clarity of the claims, claims 1 and 5 have been amended herein, and new claims 6 and 7 have been added. It is believed that claim 1, directed to a coating for water blocking agents, and claim 5, directed to a water blocking construction method, as amended herein, are fully in compliance with the requirements of 35 U.S.C. § 112. Also, the title has been amended herein to shorten the title in response to the Examiners' suggestion.

In further explanation of the present invention, Applicants note that the language "water blocking" in the claims must be considered as the prevention of water from leaking out through gaps between substrates (particularly between neighboring substrates). In various construction situations, continuous walls are used as temporary shoring walls formed by sheet pile or steel tubular pipe, e.g., in the construction of underground installations, secondary protective barriers in industrial waste disposal facilities, etc. It is respectfully submitted that these terms would be understood by persons skilled in the art to which the present invention pertains.

Turning to the rejection under 35 U.S.C. § 103(a), the Office Action indicates that "Perry teaches heat pump systems in which a heat pipe is surrounded, while in the ground with particles that contain hydrophilic water swellable polymer (col.4, lines 41+) and hydrophilic polymers sprayed using carriers (col.6, lines 57+)."

However, Perry discloses in terms of hydrophilic polymers, at col. 6, lines 59-62 that

> "Such a material could be sprayed with an appropriate carrier and permitted to dry on and be bonded to the surface of the particles"

and subsequently at col. 6, lines 65-66 that

> "Hydrophobic polymeric materials may also be employed for the film by use of known techniques.

Moreover, Perry discloses at col. 5, lines 61-67 that

> "Referring to FIG. 2, a preferred embodiment of absorbent particles 20 is illustrated in which the absorbent water-soaked core 21 is coated with a thin film 22 of material which is essentially impermeable to water and non-

> biodegradable in the soil. A major advantage of film 22 is to prevent evaporation of water from the water-soaked core material."

That is to say, such polymers sprayed using carriers as described at col. 6, lines 57+ are essentially impermeable to water regardless of hydrophilic or hydrophobic property.

On the contrary, the hydrophilic binder resin (b) of the present invention is capable of functioning as a binder to fix the water-absorbing resin (a) on the substrate, and is defined by a numeric range of acid value in order to have an appropriate hydrophilic property. As a result, the presently claimed invention achieves superior results and advantages, in that the hydrophilic binder resin (b) is easy to apply to the substrate (e.g. joint sections of sheet pile), in particular being less peelable from the substrates (joint sections of sheet pile) in the step of driving into the ground, and in the ground it does not decrease the soil water absorption by the water-absorbing resin (a), and does not inhibit the same from swelling to a sufficient extent, as described at page 4, line 31 to page 5, line 10 and at page 12, line 27 to page 13 line 6 of the present specification.

Further, Perry et al discloses, at col. 2, line 64 to col. 3, line 2,

> "It is an object of the invention to provide a method and means for improving the heat transfer to the underground heat pipe of a heat pump. It is a particular object of the invention to accomplish the foregoing object by including

highly absorbent particles soaked with water or water-filled, balloon-like bags in the soil back-fill."

On the other hand, as described at page 7, lines 6-32 in the present specification, the coating for water blocking agents according to the invention, when applied to the substrate surface, forms a water blocking coating film (water blocking layer) and thereby fills the gap between substrates (more specifically between neighboring substrates) for attaining the cutoff of water. The water blocking coating film absorbs water in the ground (soil) and swells and thus fills the gap between substrates, whereby the cutoff of water can be realized. For example, in cases that substrates such as sheet piles are used to construct a continuous sheet pile wall, if the substrates alone are driven into the ground (soil), gaps are formed in the joint sections between substrates, allowing leakage of water. If a water blocking layer is formed on a substrate surface in the joint section, the water blocking layer absorbs water in the ground (soil) and swells and thus fills the joint section gap between substrates, whereby cutoff of water can be realized.

Therefore, the present invention is totally different from the Perry et al reference in the field of the endeavor and the particular problems to which the invention is directed.

The Office Action also indicates that "It is deemed desirable to simplify the placement of the pipes into underground locations by precoating them with useful compositions in order to eliminate the need for subsequent steps to insert the compositions around the pipes after they have been placed into the ground."

However, as described at page 26, line 20 to page 27, line 4 in the present specification, the present invention has as an object to provide the water blocking agent(s) and the water blocking construction method which construct a water blocking wall in the ground to substantially prevent the coating films from peeling off on the occasion of driving the substrates into the ground, and rapidly absorb water in the ground and swell and thus fill gaps and exhibit the water blocking performance at an early state. It is further possible for the coating films to maintain the water blocking performance stably at a high level and for a prolonged period of time.

Therefore, the particular problem to which the present invention is directed is constructing a water blocking wall in the ground, not simplifying the placement of the pipes into underground locations. That is to say, the reference is not reasonably pertinent to the particular problem with which the present invention is directed.

In addition, the reference fails to teach or suggest such "water blocking agent(s)" and "water blocking construction method" as set forth in the claims of the present invention. In this respect, these means in the present claims are clarified as indicated above.

Concerning the convincing objective evidence, Table 1 on page 34 and page 35, line 21 to page 36, line 5 in the present specification clearly show that the water blocking agent(s)

comprising the hydrophilic binder resin (b) within the acid value of the present invention exhibit a significant unexpected property on the water blocking performance *vis-à-vis* the comparative examples.

Accordingly, the present claims are unobvious and patentable over Perry et al.

In view of the foregoing, it is respectfully submitted that the rejection under 35 U.S.C. § 103(a) based on Perry and the alleged admission in the specification should be withdrawn, and claims 1-7 allowed forthwith.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: February 26, 2003

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title is changed as follows:

COATING FOR WATER BLOCKING AGENTS ~~COATING FOR WATER BLOCKING AGENTS, SHEET PILE AND STEEL TUBULAR PIPE FOR WATER BLOCKING CONSTRUCTION, AND WATER BLOCKING CONSTRUCTION~~

IN THE CLAIMS:

Claims 1 and 5 are amended as follows:

1. (amended) A coating for water blocking agents to fill empty joint spaces on continuous walls comprising a water-absorbing resin (a), a hydrophilic binder resin (b) and a solvent (c) as essential components,

wherein said hydrophilic binder resin (b) has an acid value of 40 mg KOH/g to 500 mg KOH/g.

5. (twice amended) A water blocking construction method to fill empty joint spaces on continuous walls which comprises ~~utilizing~~ applying to said walls

(1) a coating for water blocking agents comprising a water-absorbing resin (a), a hydrophilic binder resin (b) and a solvent (c) as essential components, wherein said hydrophilic binder resin (b) has an acid value of 40 mg KOH/g to 500 mg KOH/g, or

(2) a sheet pile and/or steel tubular pipe for water blocking construction methods wherein the coating for water blocking agents according to (1) has been applied thereto.

Claims 6 and 7 are added as new claims.

6. (new) The coating for water blocking agents according to Claim 1 wherein the coating for water blocking agents is removable from the substrate of continuous walls after use.

7. (new) The coating for water blocking agents according to Claim 2 wherein the coating for water blocking agents is removable from the substrate of continuous walls after use.